"Ingrown" Nails and Other Toenail Problems

Surgical Treatment

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• **Appropriate office treatment for "ingrown" or deformed toenails can bring quick and lasting relief. The principle is the removal of the portion of the nail that irritates. For mild problems, a buried nail corner or spur may be successfully trimmed away without anesthesia. More extensive infection requires a nerve block anesthetic of the toe and removal of a wide triangle of deformity with nail edge and the mass of heaped up granulations.**

Chronic or recurrent infection is often associated with some abnormality of the nail. It usually saves time and suffering in the long run to remove a third or so of the width of the nail together with its matrix or "root." Sharp dissection is relatively easy and far more dependable than other methods of removal or destruction of the matrix. The matrix of the entire nail can be removed just as easily to eliminate such problems as the grossly thickened nail of onychogryphosis.

TREATMENT for relief of patients suffering from the miserably painful "ingrown toenail" need not be prolonged or painful or unduly complicated. Simple surgical principles applied with some knowledge of the anatomic features of the toenail and of the common causative factors suffice. The operation can be done in a physician's office.

Anatomic features of the toenail are illustrated in Figure 1. The nail plate begins 3 to 4 mm. proximal to its visible base. The matrix, from which it grows, extends from about 7 or 8 mm. proximal to the visible base of the nail to the distal margin of the crescent, visible beneath the nail, called the lunula. The matrix forms the nail. The nail plate grows outward, sliding over the nail bed, to the tip of the digit. It is quite important to remember that the nail plate is wider than the visible portion, the edges being hidden in the nail grooves, covered by the nail folds on either side. These hidden edges are soft and tend to tear raggedly across when the nail is trimmed in a rounded manner. In the permanent removal of part or all of the nail matrix, it is important to note that the matrix is wider than the nail plate and starts considerably more proximal than the base of the nail plate, especially in the corners.

ETIOLOGY

Various observers' experiences seem to have led to widely diverse impressions as to the importance of the various factors leading to "ingrown toenail."

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In my experience the order of frequency of various etiological factors is:

1. Improper trimming of nails, leaving a ragged corner or sharp spur hidden in the nail groove when the nail was cut rounded (Figure 2).

2. Acute trauma or chronic pressure lacerating the nail groove flesh against the nail edge. Short or too narrow shoes and stockings are a major cause of the chronic pressure problem. The pressure may be of a shoe against the medial edge of the nail or,

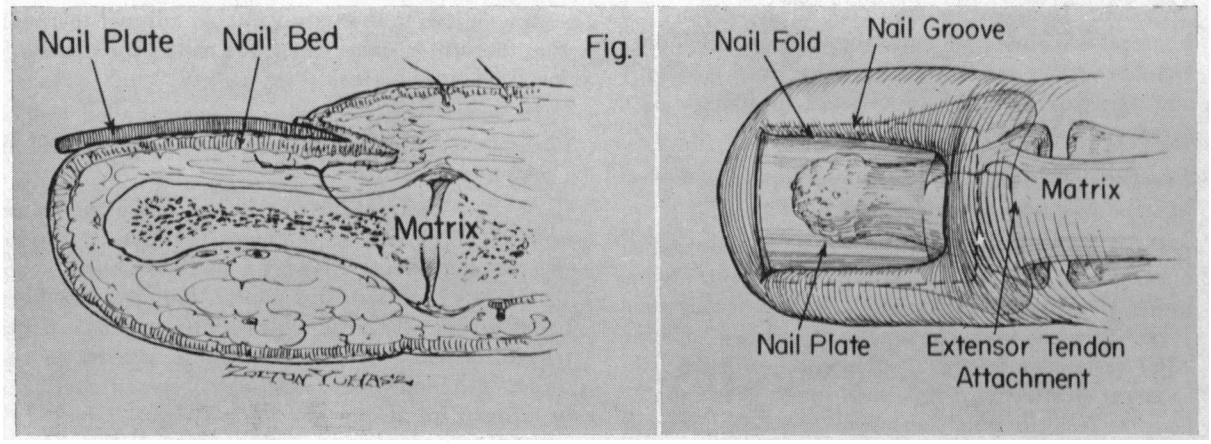

Figure 1.—Anatomic features. Note especially the relations of the visible nail, nail plate and matrix.

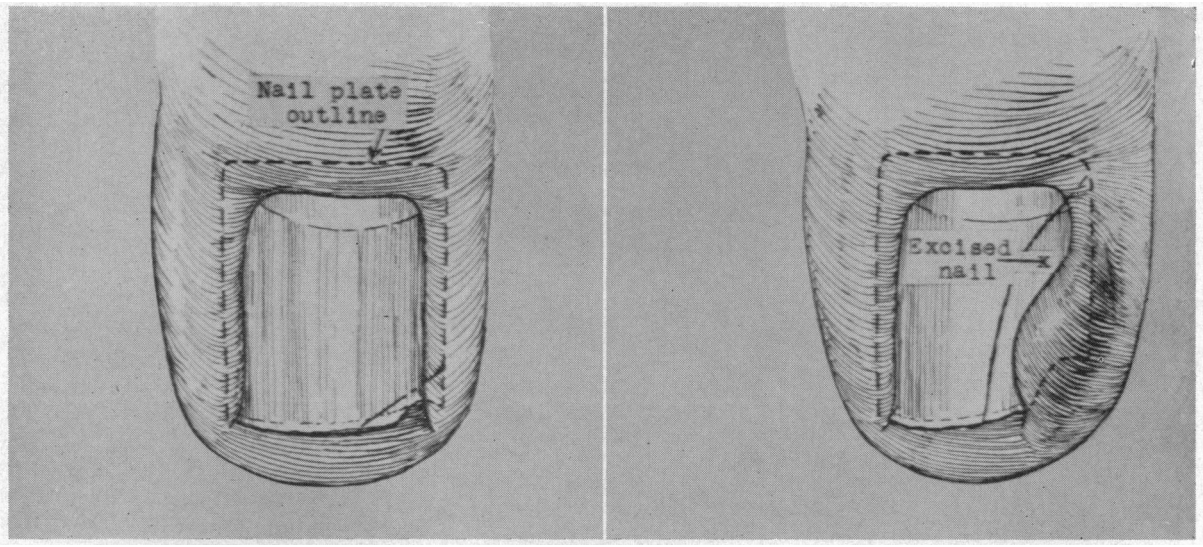

Figure 2.—*Left,* Mild inflammation. The necessary procedure is trimming of the nail corner or the spur. *Right,* severe infection—indication for removal of large triangle of nail plate and excision of swollen tissue.

more commonly, from the impingement of the lateral side of the great toe against the second toe.

3. Anatomical variations that seem to contribute in one way or another to recurrence or chronicity are often indications for the more radical operation to be described later in this communication. These include (a) too wide or obliquely growing nails, which exaggerate the pressure of the shoe or the second toe against the nail edge, (b) inward curling nail edges (seen almost exclusively in adults), (c) flabby flesh that tends to heap up over the nail edge (rarely seen by the author except with active infection), (d) poor vascularity of tissue due to arteriosclerosis or diabetes—important in causation and in delayed healing or even failure of healing, (e) deep nail folds holding collections of dead skin and dirt.

4. Infection from injudicious manipulation by the patient or another person, usually in a patient with poor circulation.

5. Chronic fungus infections (rarely seen by the author).

Secondary factors of considerable importance in many cases are: (a) the tendency of a weak longitudinal arch to allow the foot to lengthen excessively on weight-bearing, jamming the toes into the end of a shoe that was thought to be adequately long; (b) high heels that make the foot slide forward, crowding the toes into the narrowed front part of the shoe.

DEGREES OF SEVERITY: APPROPRIATE TREATMENT

"All surgical treatment," as Fowler[1] so aptly said, "consists in either removing the nail from the nail wall or removing the nail wall from the nail." Although usually not necessary, sometimes if infection is acute, it is desirable to use antibiotics, hot soaks or wet dressings, to limit ambulation and to cut away the shoe for relief of pressure for several days before beginning more definitive treatment. Treatment varies with the degree of severity:

Mild degree of infection, such that the nail corner can be inspected. Although disease of this order often is treated by packing cotton under the corner or by one of the many ingenious methods to protect the infected nail groove from the nail edge and any sharp corners or spurs, the necessary manipulations are painful and return visits are expensive. Usually, without anesthesia, it is possible to expose the nail edge gently and trim away a triangle of nail, including the usual sharp corner or spur left by improper nail cutting (Figure 2, left). This followed by application of an antiseptic solution, hot soaks, wearing a cut-out shoe during healing and then proper nail trimming and choice of shoes and stockings, will result in permanent cure in most cases.

More severe infection, with swelling and granulations (Figure 2, right). In most such cases anesthesia is necessary because manipulation causes extreme pain. Injecting about 1 cc. of 1 per cent xylocaine (without epinephrine) into the vicinity of each of the four digital nerves at the base of the toe brings about excellent anesthesia in 5 to 10 minutes. A wide rubber band or small penrose drain held tight around the toe with a hemostat limits bleeding during the procedure. If permanent removal of the nail appears not to be necessary—and often it is not in cases of this degree of severity—it may be well to combine removal of the nail from the infected tissue and removal of the swollen and hypertrophied

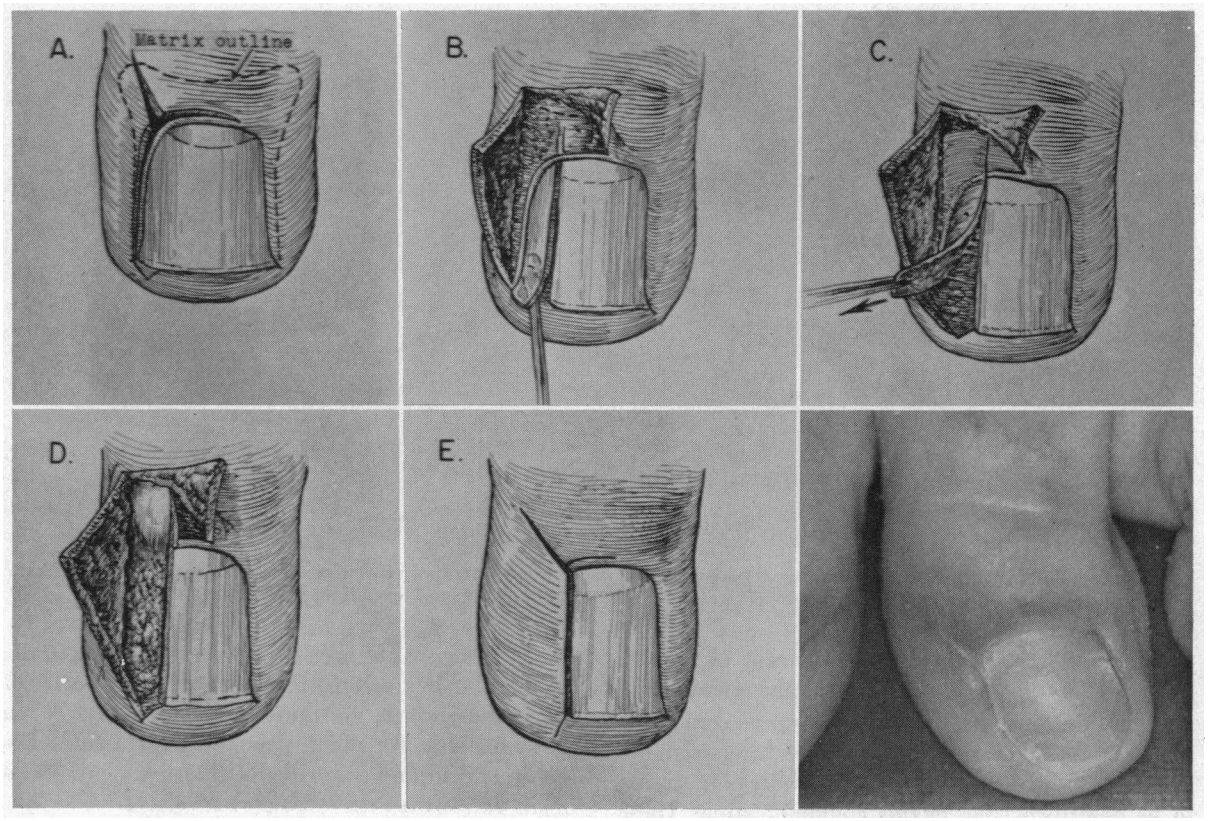

Figure 3.—Permanent removal of nail edge. *A*, incision; *B*, skin flaps turned, nail split and portion being separated by blunt dissection; *C*, incision through matrix and nail bed. Nail bed and nail fold being dissected; *D*, dissection completed; *E*, operation completed; *F*, fourteen weeks after operation.

nail-fold overhanging the edge of the nail. To do this, stout scissors with a sharp point are used to cut away a large wedge of nail (Figure 2, right), care being taken to extend the cut smoothly to the very edge of the nail plate. The triangular piece can then be bluntly separated from the nail bed and the lateral fold. Usually a vicious-looking nail edge spur will be found buried in the granulations. After curettement of the granular material, a generous ellipse of the swollen nail fold is removed, so that after healing the lateral nail groove will be quite shallow. The raw surfaces exposed by this procedure heal rapidly when treated with intermittent hot soaks and application of a small ointment-coated dressing. By wearing a cutout shoe the patient can walk without much pain almost as soon as the anesthetic wears off, but elevation of the foot for the remainder of the day of operation is advisable.

Infections of long standing may have undermined the nail, or extended proximally to become paronychia or (less commonly) may have burrowed plantarward into the pulp. Often in these cases removal of the entire nail is indicated, with whatever additional incisions are needed to open all pockets of infection and clear away granulated material and debris. Removal of the nail is not likely of itself to disturb regrowth of a normal nail, but chronic infection about the base of the nail may have so altered the matrix that the new growth is abnormal. Care after operation consists of keeping the foot elevated until infection is under control, loose packing of all opened infected pockets for one or two days, then hot soaks and use of small, ointment-coated dressings. A shoe cut to avoid pressure at the point of soreness may be used for walking until healing is complete.

Chronic infection associated with anatomical abnormalities will often necessitate choosing between (1) going ahead immediately with the permanent removal of part or all of the nail together with its matrix, as described below, and (2) use of one of the foregoing procedures as a temporary measure for relief of acute infection before undertaking the definitive treatment.

PERMANENT REMOVAL OF THE NAIL

The method here described for permanent removal of all or any portion of the nail entails a minimum of temporary disability, is cosmetically acceptable and is suitable for use in a physician's office. I evolved the procedure myself after years of look-

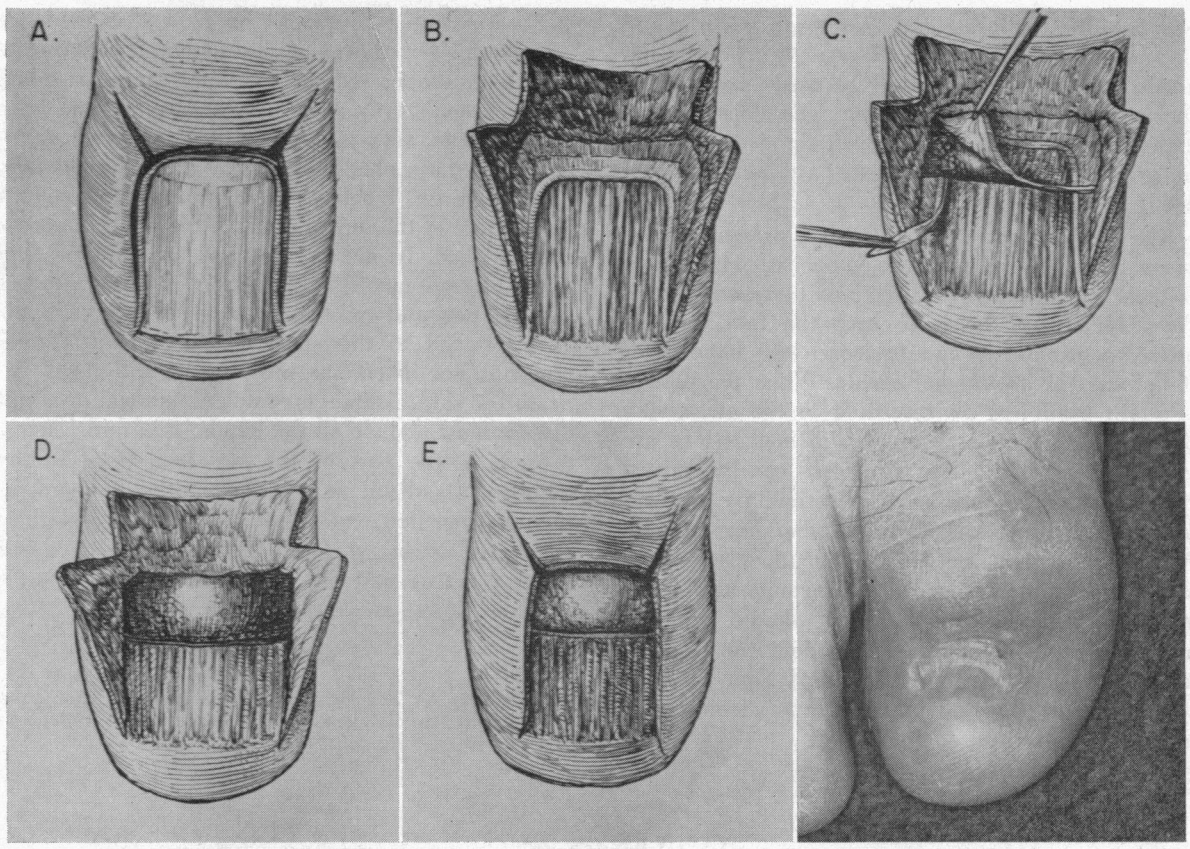

Figure 4.—Permanent removal of entire nail. *A*, incision; *B*, flaps turned, nail plate having been removed; *C*, incision across nail bed and nail walls distal to the lunula. Beginning dissection of matrix and nail walls; *D*, dissection finished; *E*, operation completed; *F*, seventeen weeks after operation.

ing at the fragments of nail regrowing on my own two great toes. I have since found in the literature a few scattered descriptions of methods embodying the same principles and apparently equally effective.

Any condition in which a narrower nail or absence of the nail might be of help is an indication for this procedure. Such conditions would include recurrent "ingrown toenail" in which the nail is too wide for the toe or is growing obliquely or is sharply curled at the edges. Also included are cases in which pain is caused by gross thickening or other abnormality of a nail, such as often follows trauma or chronic infection or comes on with age.

Contraindications are (a) circulation so impaired as to jeopardize healing and (b) active acute infection. Chronic infection need not cause delay, usually, if the wound is left unsutured and a small piece of rubber tissue is placed for drainage.

PROCEDURE

The patient lies supine on the operating table with knee bent and foot flat on the table surface with the toes near the surgeon, who sits at the end of the table. One margin or both or the entire nail may be removed, as illustrated in Figures 3 and 4. After anesthesia is brought about as previously described a tourniquet is applied. The incisions should be made well away from the nail because the matrix from which the nail grows extends wider and higher than the nail plate—like horns (Figure 1). The nail plate can be split with strong, sharp-pointed scissors. The portion of nail that is to be removed is easily separated from its bed by use of mosquito forceps or a small nasal elevator. Following a cleavage plane when dissecting the matrix from below makes it easier to see and remove all the matrix as one progresses, and to distinguish the tapered proximal margin. For good visualization, retraction, the use of binocular magnifiers and a good light are important. It must be borne in mind that the matrix, which must be entirely removed, extends to the distal margin of the lunula, visible through the proximal part of the exposed nail. Any recurrence is evidence of incomplete removal.

As a refinement the nail folds can be removed to eliminate dirt catchers and improve the cosmetic result. Whatever raw areas there may be at the completion of the procedure are small enough to

heal rapidly. Elaborate flap operations, grafting and partial amputations, often advocated, are quite unneeded. Sutures should rarely be used—never when there is any infection present. The flaps fall together well, even if packed open for a day or two to provide drainage. Ligatures are almost never used.

The foot is kept elevated, with a pressure dressing in place, until bleeding is controlled. The patient is then sent home with directions to return in two days. Meanwhile he is to keep the foot elevated nearly continuously and to loosen the bandage if it becomes at all uncomfortable. When the patient is again examined on returning to the office, if a drain was used it is removed and instructions are given to begin hot soaks. The soaks can be omitted if there is no indication of infection. By the end of a week a Band-Aid® is usually bandage enough. An old shoe with the toe of the upper cut away and the sole intact is more comfortable and better appearing than a slipper and it should be used until healing is complete. The patient can walk as much as he can without discomfort after the first two or three days. The time away from work usually is only three to four days.

As was noted previously, regrowth is evidence of incomplete removal of the matrix. Two patients on whom I operated for total permanent removal of thickened horny nails returned some time later with definite, very thin shells of very slowly growing nail. This phenomenon was quite acceptable, but a surprise. I believe in each case I left behind just a little of the lunula distal to the incision across the nail bed. In one of the two cases microscopic study of sections of the base of the new nail showed that the new nail and the matrix from which it grew corresponded to the area of the previous lunula and did not extend as much as a millimeter beneath the skin. Although complete removal of a nail matrix must include all the lunula, it is unnecessary to remove the part of the nail bed distal to the lunula. This distal nail bed is epithelium and although when left exposed it toughens to a slightly rough or horny surface, it probably can never produce a true nail that needs cutting.

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REFERENCE

1. Fowler, A. W.: Excision of the germinal matrix: a unified treatment for the embedded toenail and onychorgryphosis, Brit. J. Surg., 45:382-387, Jan. 1958.

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